

CONSCIOUS COMMUTING



As you ride to Six Flags Great America be conscious of some of the PHYSICS on the way.

A. STARTING UP THINGS TO MEASURE:

As the bus pulls away from a stop sign, find the time it takes to go from rest to 20 miles per hour.

You will have to put someone up front to help.

$t =$ _____ seconds

THINGS TO CALCULATE: ALWAYS SHOW EQUATIONS USED AND SUBSTITUTIONS

1. Convert 20 miles per hour to meters per second. $v =$ _____
(1.0 MPH = 0.44 meters/second)
2. Find the acceleration of the bus. $a =$ _____
3. Using your mass in kilograms and Newton's Second Law, find the average forward force on you as the bus accelerates from rest
 $F =$ _____
4. Is this force greater or less than the force gravity exerts on you (your weight).
5. Calculate the force-factor that you felt.

$$\text{force-factor} = \frac{\text{force calculated (question 3)}}{\text{weight}} = \frac{N}{N} = \underline{\hspace{2cm}}$$

(PLEASE NOTE: The force-factor has no units.)

THINGS TO NOTICE AS YOU RIDE:

1. As you start up, which way do you FEEL thrown (forward or backward)?
2. If someone were watching from the side on the road, what would that person see happening to you in relation to the bus?
3. How can you explain the difference between what you feel as the bus starts up and what the observer sees? (You may want to use the ideas of FRAMES OF REFERENCE).

Conscious Commuting-Cont'd

B. GOING AT A CONSTANT SPEED - THINGS TO NOTICE

1. Describe the sensation of going at a constant speed. Do you feel as if you are moving?
2. Are there any forces acting on you in the direction you are moving? Explain what is happening in terms of the principle of inertia.

C. ROUNDING CURVES - THINGS TO NOTICE

1. If your eyes are closed:
 - a. How can you tell when the bus is going around a curve?
 - b. What do you feel when you are seated facing forward?
 - c. What do you feel when you are seated with your back against the side of the bus?
2. Before the bus starts around a curve, concentrate on a tree or a building that is directly in front of you. From the law of inertia, you know that your body should continue straight ahead unless an unbalanced force acts on it. See if you can sense the force that causes you to go around the curve.
 - a. What is the direction of the force?
 - b. If the turn was tighter (smaller radius) how would the force be different?
 - c. How is this force applied to your body: (a) the friction of the seat, (b) your seat mate, (c) the wall, (d) the arm of the seat or (e) a combination of these? Explain.
3. Many of the rides in the amusement park involve going around curves. Be prepared to compare what you are feeling on the bus with sensations on the rides. Predict some differences you expect to feel.